

REMARKS

This paper is filed in response to the Office action mailed on June 11, 2008. Claims 89-92 are canceled herewith, leaving claims 81-88 and 93-96 pending in the application. In view of the above amendments and following remarks, reconsideration and allowance of all pending claims are respectfully requested.

The claim amendments presented herein are fully supported by the specification as originally filed. Each pending independent claim is amended to specify that the compressor is operable in at least heating and cooling modes. Support for this claim language is found throughout the specification and is well known in the art. Each independent claim is further amended to specify that the exterior heat exchanger is positioned at a lower elevation than the compressor. Support for this claim language is found at paragraph [41], lines 5-7, and is generally understood in the art as a hallmark of any geothermal heat exchange system. Finally, each independent claim is amended to specify that the compressor is configured to pressurize the system refrigerant to a continuous operational pressure at least 33% greater than the working pressure of R-22 refrigerant in both the heating and cooling modes. This is merely a restatement of previous elements presented in the claims. Accordingly, the amendments presented herein find adequate support in the original specification, and therefore no new matter is presented thereby. Consideration and entry of the amended claims are respectfully requested.

Turning to the Office action, claim 81 was rejected for an informal error. Claim 81 is amended herewith to correct the error as suggested by the Examiner, and therefore this objection should be withdrawn.

The Office action also rejects claims 81-82, 85-86, and 89-90 under 35 USC 103(a) as obvious over U.S. Patent No. 6,354,097 ("Schuster") in view of U.S. Patent No. 5,946,928 ("Wiggs"). Applicant traverses this ground of rejection.

Each of the remaining independent claims 81, 85, 93, and 95 now recites a compressor configured to pressurize a system refrigerant to a continuous operational pressure at least 33% greater than the working pressure of R-22 refrigerant in both the heating and cooling modes. The increased operational pressure is of particular benefit to direct expansion geothermal heat exchangers, where the exterior heat exchanger is connected to the compressor and is positioned

at a lower elevation than the compressor. In such systems, the higher refrigerant pressure offsets the adverse effects of gravity when the system is operating in the cooling mode, where condensed liquid refrigerant must be returned uphill against the force of gravity. It is not seen that the cited prior art discloses or teaches a direct exchange geothermal heat exchanger¹ having a compressor configured to pressurize a system refrigerant to a continuous operational pressure at least 33% greater than the working pressure of R-22 refrigerant in both the heating and cooling modes, or the benefits derived therefrom.

The rejection as stated in the Office action fails to address the specific language of independent claims 81, 85, 93, and 95. More specifically, each independent claim specifies not only a refrigerant capable of higher operational pressures, but also a compressor that pressurizes the refrigerant to the higher pressures during system operation. The Examiner's rejection only addresses the first element, i.e., the disclosure of a refrigerant that is merely capable of higher operational pressures. Specifically, the Examiner argues:

...Schuster explicitly teaches the method and apparatus of providing a refrigerant with system operational working pressures at least 33% greater than the system operational working pressures of R-22 (col 1, lines 21-32).

These comments do not, however, address the specific language of the independent claims, which not only recite a refrigerant capable of higher working pressures but also specifically require a compressor that actually pressurizes the refrigerant to the higher working pressures during operation of the system. Accordingly, the rejection as stated fails to address each element of independent claims 81, 85, 93, and 95, and therefore must be withdrawn.

Notwithstanding the foregoing deficiency in the rejection, the cited prior art not only fails to disclose or suggest a compressor configured to pressurize the refrigerant at a continuous

¹ The Examiner argues on page 3 of the Office action that the phrase "direct expansion geothermal heat exchange system" is merely "part of the preamble and does not significantly add to the meets [sic] and bounds of the claim and therefore is given limited patentable weight." In response, applicant notes that each independent claim now specifies an exterior, sub-surface heat exchanger as well as tubing connecting the exterior heat exchanger to the compressor. Accordingly, the positively recited elements of the claims specify a direct expansion geothermal heat exchange system or method.

operational pressure at least 33% greater than the working pressure of R-22 refrigerant in both the heating and cooling modes, but specifically teaches away from operating a heat pump system at the elevated pressures. While Schuster discloses a heat pump system that uses R-410A refrigerant, and acknowledges that such refrigerant is capable of operating pressure up to 70% higher than R-22, Schuster specifically teaches the use of controls to limit operational pressures in the system to the R-22 range. At Column 4, lines 47-52, Schuster states that refrigerant pressure in the system should be reduced when it reaches the design pressure of the line set or the indoor coil. The line set and the indoor coil, in turn, are existing structures having design pressures corresponding to the use conventional R-22 refrigerant in the system. (Schuster, Column 2, lines 2-11, and Column 4, lines 23-46). Schuster, therefore, teaches that the heat pump system should maintain operational pressures within the lower limits of R-22 refrigerant. This directly contrasts with the subject matter of the pending independent claims, where the compressor is configured to pressurize the refrigerant to a continuous operational pressure at least 33% greater than the working pressure of R-22.

The Examiner's "Response to Arguments" on this point fails to consider the prior art reference in its entirety. The Examiner incorrectly contends that the mere recitation in Schuster of R-410A refrigerant in Schuster, and its capacity to operate at pressures up to 70% higher than R-22, satisfy the currently claimed subject matter. The Examiner, however, must consider the prior art reference "in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP Section 2141.03, citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983)(emphasis in original). Thus, while Schuster discloses a refrigerant that is capable of a higher operating pressure, it specifically teaches away from operating its system at such an elevated temperature, as noted above. Accordingly, Schuster fails to disclose or suggest a system that includes a compressor configured to pressurize the refrigerant at a continuous operational pressure at least 33% greater than the

working pressure of R-22 refrigerant in both the heating and cooling modes, as specified in each pending claim.²

Wiggs fails to supply the deficiency in Schuster noted above. Wiggs does not disclose or suggest a compressor configured to pressurize a refrigerant to the operational pressures as specified in the independent claims, nor does the Examiner contend as such. Instead, Wiggs is cited merely for disclosing a direct expansion geothermal heat exchange system. Accordingly, the proposed combination of Schuster and Wiggs fails to disclose or suggest each element of independent claims 81, 85, 93, and 95, and therefore these claims are patentable over the cited prior art.

Claims 82-84, 86-88, 94, and 96 all depend from independent claims 81, 85, 93, and 95, respectively. These claims are patentable over the cited prior art for the same reasons presented above.

² The Examiner also incorrectly contends that Schuster teaches an “exterior sub-surface heat exchanger (16)...” At no point does Schuster disclose or suggest that the heat exchanger (16) is located sub-surface. Furthermore, such a location is highly unlikely, as the heat exchanger (16) of Schuster requires a fan to exchange heat, rather than using a geothermal exchange of heat. A sub-surface exterior heat exchanger is generally known from prior geothermal heat exchangers, however, and therefore applicant does not suggest that this element differentiates the claims from the prior art as a whole. Rather, this point is raised merely to note the technical error in the rejection as stated in the Office action.

CONCLUSION

It is submitted that the present application is in good and proper form for allowance. A favorable action on the part of the Examiner is respectfully solicited.

If, in the opinion of the Examiner, a telephone conference would expedite prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

The Patent Office is hereby authorized to credit any overpayment or charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith to our Deposit Account No. 50-3629.

Respectfully submitted,
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November 25, 2008

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